

CLAIMS

1. A reactor for preparing a compound comprising

(a) at least one neutral, positive, or negative increased binding energy hydrogen species having a binding energy

(i) greater than the binding energy of the corresponding ordinary hydrogen species, or

(ii) greater than the binding energy of any hydrogen species for which the corresponding ordinary hydrogen species is unstable or is not observed because the ordinary hydrogen species' binding energy is less than thermal energies or is negative; and

(b) at least one other element, said reactor comprising:

a vessel containing

an electron source and

a source of increased binding energy hydrogen atoms having a binding energy of about $\frac{13.6 \text{ eV}}{\left(\frac{1}{p}\right)^2}$ where p is an integer greater than 1,

whereby electrons from said electron source react with increased binding energy hydrogen atoms from said source in said vessel thereby producing said compounds.

2. A reactor of claim 1 wherein the increased binding energy hydrogen species is a hydride ion having a binding energy greater than about 0.8 eV.

3. A reactor of claim 1 or 2 wherein said source of increased binding energy hydrogen atoms is a hydrogen catalysis cell selected from a group consisting of an electrolytic cell, a gas cell, a gas discharge cell, and a plasma torch cell.

4. A reactor of claim 3 wherein said hydrogen catalysis cell comprises a second vessel containing

a source of atomic hydrogen;

at least one of a solid, molten, liquid, or gaseous catalyst

having a net enthalpy of reaction of at least $m/2 \cdot 27$ eV, where m is an integer,

whereby the hydrogen atoms react with the catalyst in the second vessel thereby producing a hydrogen atom having a binding energy of
 5 about $\frac{13.6 \text{ eV}}{\left(\frac{1}{p}\right)^2}$ where p is an integer greater than 1.

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